Environmental Accounting

Basic Information on Environmental Accounting Issues

Environmental Accounting and the formation of environmentally oriented accounting system are questions, which occupy many national and international organisations and institutions. The possibilities of integration of the individual approaches to the Environmental Accounting into a common accounting frame, their conceptions, used accounting and evaluation methods and the like are subject of extensive discussion at both international and national levels. The Czech Republic begins to take increasingly more active part in these discussions. In the Czech Republic, the issues of Environmental Accounting are being solved on the macroeconomic and company level.

It can be stated that, at the macroeconomic level of Environmental Accounting, many activities and their outputs are comparable to the outputs in the European Union countries. In relation to the issues solved, the following Working Sub-Groups were established:

- EPEA and NAMEA
- the Hessian Method of Evaluation of the Ecological Roles of the Nature and Environmental Reporting at the Macroeconomic Level
- Soil Utilisation Accounting
- Cost Curve Construction
- Methodological Issues of Adjustments of National Accounts and Adjustments of Other Relevant Data
- Model Support

At the session of the Working Group for Macroeconomic Issues of Environmental Accounting on 5 October 2001, it was proposed and approved that only one Working Group pursuing the topic in question shall be established within the Macroeconomic Level Environmental Accounting Working Group without further division to Sub-Groups.

In this field, the Czech Republic takes an active part in the EUROSTAT ”Overall National-Economy Accounts of the Environment” Working Group sessions.

In the Company Level Environmental Accounting field, gradual implementation of monitoring of the environmental indicators must be secured in constantly growing number of companies in follow-up of the EMS/EMAS System. In relation to the issues solved, the following Working Sub-Groups were established:

- Methodology of Monitoring Impact of the Legislative Changes at Company Level and Creation of Terminology Consistent with International Standards
- Environmental Managerial Accounting (EMA, identification of environmental costs) - Environmental Reporting at Company Level

In this field, the Czech Republic takes an active part in the UNSTAD sessions, the employees of the Ministry of the Environment underwent a training in the seminar ”Training of Environmental Accounting Trainers” and they take part in the ISAR Working Group sessions. In the Company Accounting field, co-operation with the Expert Working Group focused at improving the role of governments in the promotion of Environmental Company Accounting (Environmental Managerial Accounting –”EMA”), which was established on the basis of an UNO initiative, is also thriving lately.

Survey of Working Sessions and Seminars:

3 May 2000	Working Session on Environmental Accounting Issues at Macroeconomic and Company Level This session has shown, on what level the individual issues are handled, and – concurrently – the objective to unify administration studies in problem spheres was outlined. Two working groups were established on this session: Macroeconomic Level Environmental Accounting Working Group and Company Level Environmental Accounting Working Group.
12 September 2000	The first Joint Session of Environmental Accounting Working Groups On this session, the establishment of Sub-Groups, the sessions of which now take place separately, was decided on.
31 November 2000	Working Session on the Environmental Company Accounting Issues This session was concluded by sessions of the three Working Sub-Groups in the Environmental Company Accounting field.
27 April 2001	Session of the Working Sub-Group on the Environmental Managerial Accounting Issues within the Environmental Company Accounting Group
28 May 2001	Working Session on Environmental Company Accounting Issues The aim of this session was to acquaint the participants with the latest findings in the environmental protection field, which imply requirements concerning company information systems and which affect the financial situation of the companies.
5 October 2001	Session of the Macroeconomic Level Environmental Accounting Working Group It was decided on this session that the Working Group should continue to work jointly without division to Working Sub-Groups.

29-31 October 2001	International Regional Seminar on Environmental Company Accounting Issues. The seminar included attendance at the EnviBrno Fair opening. The individual countries of the region – Hungary, Poland, Slovakia and the Czech Republic presented their experience up to now with putting Environmental Company Accounting in practice. It was agreed at the end of the seminar that this seminar should take place in Warsaw the next year.
26 February 2002	Session of the Macroeconomic Level Environmental Accounting Working Group devoted to the environmental damage evaluation issues At this session, the paper of Ing. Petra Málková, ”Environmental Damage Evaluation in Legislation of the United States of America”, to which a lively discussion broke out, was presented.
26 March 2002	Session of the Working Sub-Group on Environmental Managerial Accounting Issues within the Environmental Company Accounting Group At this session, the Working Sub-Group discussed a material addressing environmental cost issues based on the conception and approach of the Expert Working Group on ”Improving the Role of Government in the Promotion of Environmental Managerial Accounting” (Jasch Ch.: *Workbook 1, Environmental Managerial Accounting: Metrics, Procedures and Principles).*
24 June 2002	Session of the Working Sub-Group on Environmental Managerial Accounting Issues within the Environmental Company Accounting Group At this session, the Working Sub-Group discussed a material addressing environmental cost issues based on the conception and approach of the Expert Working Group on ”Improving the Role of Government in the Promotion of Environmental Managerial Accounting” (Jasch Ch.: *Workbook 1, Environmental Managerial Accounting: Metrics, Procedures and Principles).* ? doslovné opakování záznamu pro zasedání dne 26. března 2002 / word-for-word repetition of the record for the session on 26 March 2002 (poznámka překladatele / Translator’s Note)
25 June 2002	Session of the Macroeconomic Level Environmental Accounting Working Group devoted to the issues of economic modelling utilisation in evaluation of environmental and regional policy. Within the individual presentations, the HERMIN model (and) z originálu není zřejmé, zda “byl prezentován model HERMIN, tj. aplikovaný model všeobecné rovnováhy” nebo “byl prezentován model HERMIN a aplikovaný model všeobecné rovnováhy” “ / it is not clear from the original, whether “the HERMIN model, i.e.

	the applied model of general equilibrium, was presented" or "the HERMIN model and the applied model of general equilibrium were presented" (poznámka překladatele / Translator's Note) the applied model of general equilibrium were presented, the utilisation of the economic-mathematical modelling in agriculture and the use of up-to-date information technologies in environmental modelling were described at this session.
15 November 2002	National Working Session on Environmental Company Accounting Issues The aim of this session was to acquaint the participants with the latest findings in the field in question.
28 January 2003	Session of the Macroeconomic Level Environmental Accounting Working Group, the topic of which was "Market in GHGs (greenhouse gases) – a New Economic Phenomenon"
2 March 2003	Session of the Macroeconomic Level Environmental Accounting Working Group, the topic of which was "The Macroeconomic Models in the Czech Republic – the Situation and the Prospects"
1 April 2003	Session of the Working Sub-Group on Environmental Managerial Accounting Issues within the Environmental Company Accounting Group.
24 June 2003	National Working Sessions on Environmental Company Accounting Issues The aim of this session was to acquaint the participants with the latest findings in the field in question.
7 - 9 October 2003	International Scientific Conference on Environmental Company Accounting Issues "Economic Aspects of Environmental Protection" Conference purpose**:** Discourse of the latest knowledge of environmental protection sphere and their economic aspects, interchange of experience and scientific knowledge from the sphere of the implementation of the environmental management systems and environmental accounting. The Agenda will also present the results of the solution of the grant projects aimed at the given problematic. The Conference included excursion to the International Fair Trade of information and telecommunication technologies INVEX Brno (including the complementary programmes and the prezentation of information systems with support for environmental management systems)

ENVIRONMENTAL MANAGEMENT ACCOUNTING

IMPLEMENTATION GUIDELINE

1. Introduction

This guideline follows the Implementation Rules for Company Environmental Management System and Audit (updated rules), which comply with the Resolution of the Government of the Czech Republic No. 651 dated 19 June 2002. Annex I, Requirements on Organization Environmental Management System, Part 1. 3. 5 Environmental Financial Flows, stipulates the obligation to establish and maintain procedures aimed at monitoring of environmental financial flows in order to implement the environmental management accounting.

The guideline regulates the implementation methodology for the environmental management accounting.

Information on the environmental management accounting, possibilities of use and benefits thereof, information with respect to definition of corporate environmental costs and examples of concrete application of the environmental management accounting in Czech companies may be found at the Internet address of the Ministry of Environment (www.env.cz).

2. Definition of Basic Terms

Environmental management accounting (hereinafter referred to as EMA) is an indivisible element of the company management, consisting in identification, collection, estimates, analyses, reporting and transfer of

- information on material and energy flows,
- information on environmental costs and
- other quantified information, which form the basis for decision-making in a particular company.
- EMA emphasizes especially the accounting of environmental costs. It includes not only the information on environmental costs and other quantified information but also information on material and energy flows. EMA interconnects the mentioned information; it focuses on the values of material and energy flows, on the general corporate level, as well as on the level of individual corporate processes, divisions, operations etc.

EMA monitors and evaluates quantified information from the financial and management accounting (in monetary units) and data on material and energy flows in mutual relations in order to enhance the efficiency of utilization of materials and energy, mitigate the environmental impacts of corporate operations, products and services, reduce the environmental risks and improve the results of the company management.

EMA may be applied in different extents, it may include:

- individual processes or groups of processes (e.g. production line),
- system (e.g. lighting, waste water treatment, packaging),
- product or product lines,
- equipment, plant or any and all equipment at a single site,
- regional or geographic groups of plants, as the case may be,
- divisions, branches or entire company.

Costs are defined as consumption of production elements expressed in monetary units, resulting from production of corporate revenues. The costs include not only decrements of capital purposefully spent with respect to the object of business (i.e. to outputs) but for example also expenditures of social nature as gifts, expenses due to non-compliance with the set regulations (fines), expenses caused by extraordinary factors (damages), expenses implementing the government economic regulation (income tax) and other items (for example entertainment costs, remuneration paid to members of corporate bodies).

Corporate environmental costs consist of:

- costs spent on environmental protection – i.e. costs with respect to corporate measures (actions), aimed at reduction and/or compensation of adverse corporate environmental impacts, and
- costs with respect to environmental damage.

Environmental protection costs include all costs on prevention of pollution, remedies of environmental impacts, environmental planning, regulation and repair of damage arisen to companies, governments or people. Primary attention must be paid to the costs recorded to the debit of the company, i.e. recorded in the corporate accounting system.

Environmental protection measures comprise all environmental protection activities. These include

- activities resulting from government orders or legal obligations,
- activities performed for achievement of environmental protection targets set by the company and
- other voluntary activities.
- The output of the environmental protection measures always consists in a mitigation and/or prevention of environmental impacts of corporate activities, products and services.

Environmental equipment is the environmental protection equipment - equipment (including buildings, lands and intangible assets) that processes (recycles) or cleans (sanitates) gas, liquid or solid waste in the initial input form and initial quantity as produced by the main production activity.

The principle of pollution prevention means investigation as to where and why the waste is being produced and how the production thereof can be prevented. The pollution prevention may be attained by:

- mere better “management” (order),
- changes to product design, use of other (particularly non-toxic) materials and modification or change to production processes.
- Application of a preventive environmental protection strategy aimed at processes, products and services in order to enhance their efficiency and reduce the human and environmental risks is called **cleaner production** or **cleaner technology**. The pollution prevention, contrary to costly end-of-pipe technologies often substantially reduces the environmental costs and thus fulfils the concept of the “double benefit” (environmental and financial). It is a voluntary corporate initiative. On the other hand, **Integrated Pollution Prevention and Control** (IPPC), based also on the principle of prevention, is a legal obligation for large polluters. The concept of integration applies (simply spoken) to an interconnection of care for the individual environmental elements. IPPC includes also the economic point of view – it requires application of the best technologically and economically available production technologies.

Costs related to environmental damage comprise costs of “wasted” material The costs of wasted *material* include also “wasted” energy and water., “wasted” labour and production equipment and fines and penalties related to environmental damage. The material, which has not become a part of a product for the market, shall be considered a non-product output. Therefore it is an indicator of inefficiency of the production. Due to that cost elements as costs of wasted material (price of material that left the company as a non-product output), depreciation of long-term fixed assets and spent labour due to the processing of this material must be considered in the corporate calculation of environmental costs.

Environmental revenues include for example revenues from recycling of materials, sale of waste, subsidies and awards. The revenues include also all revenue items related to the environmental costs elements.

Balance of material and energy flows is a creation of a review of all material and energy flows going through the given system. The system may be a company, workplace, facility, center, process etc. The balance is based on the law of conservation of mass and energy, i.e.: the quantity of substances and energy entering the system (for example a company) must leave the system (company) or must be accumulated within the system (company) (for example, become part of stock). Inputs and outputs of substances and energy are given in physical units (for example in kg, t, GJ) and apply always to a particular selected time period (year, month etc.) The environmental accounting attaches to the identified material and energy flows their monetary values, which has a substantial importance for a correct determination of environmental costs. The information found from the balances forms the base for measures that should improve the economic results of the company and of its environmental profile.

Raw materials are substances, which upon the production process become fully or partially part of the product and form the essence thereof.

Auxiliary materials are substances that become part of the product but that do not form the essence thereof.

Operating materials are substances necessary for the operation of the company in general (for example lubricants, fuels, detergents, paper).

Packaging serves to protect and transport the purchased materials, goods and own products.

Waste is a material that has not become part of the product for the market. The term "waste" is used as a general term for solid waste, waste water and air-emissions, therefore it includes all the non-product outputs.

3. Requirements on Monitoring of Environmental Costs and Revenues

All significant environmental costs and revenues must be identified.

- To identify environmental costs we have to consider environmental impacts of all corporate activities, products and services and secure the inclusion of all significant items.
- This decision is reflected in environmental accounts in the company chart of accounts and costs related to environmental equipment or other expenditures related to environmental protection and damage.
- It is advisable to divide the environmental costs in the following categories:

The first category of environmental costs comprises the costs related to waste treatment, waste water treatment and air emissions. They include all expenditures on treatment and cleaning of produced waste, waste water and air emissions and costs of liquidation thereof.

The second category of environmental costs comprises costs of environmental management and pollution prevention. They include

- costs related to environmental management (payroll and other costs of departments involved in environmental protection, costs related to environmental management systems - EMS, external services under EMS - for example services of certification bodies etc.),
- „environmental" share - extra expenditures - of cleaner technologies projects,
- research and development related to environmental protection projects.
- The main attention in the second category of environmental costs is paid to the prevention of waste, waste water and air emissions (environmental costs do not reflect calculated costs savings). This cost category includes also increased costs of environment-friendly auxiliary and operating materials and environment-friendly technologies. The costs include also costs of research and development of environmentally benign products.

The third category of environmental costs represents the price of wasted material (= material purchase value of non-product output) The third category of costs "*material* purchase value of non-product output " includes also wasted energy and water. . The wasted materials are evaluated with their purchase values or real costs.

The fourth category of environmental costs comprises the production costs of non-product output. These include labour costs, depreciation of machinery, consumption of operating materials and financing costs wasted on a non-product output.

The environmental costs and revenues must be attached to individual environmental domains (elements):

- air and climate protection,
- waste water management,
- waste management,
- protection and sanitation of soil, ground and surface water,
- noise and vibration abatement,
- protection of biodiversity and landscape,
- protection against radiation,
- research and development,
- other environmental protection activities.
- On the basis of collected information the environmental costs and revenues statement may be compiled (Table 1).

Table 1: Corporate environmental costs and revenues statement

Environmental domains	**Air, climate**	**Waste water**	**Waste**	**Soil, ground and surface water**	**Noise, vibrations**	**Biodiversity, landscape**	**Radiation**	**Other**	**Total**
Environmental costs and revenues - category									
1. Waste, waste water and air emissions treatment									
1.1 Depreciation for waste, waster water and air emissions treatment equipment									
1.2 Equipment maintenance, operating									

materials and equipment-related services									
1.3 Personnel									
1.4 External services									
1.5 Fees, taxes									
1.6 Fines, penalties and damages									
1.7 Insurance for environmental liabilities									
1.8 Provisions for cleanup costs and remediation									
1.9 Other costs									
2. Pollution prevention and environmental management									
2.1 External services									
2.2 Personnel									
2.3 Research and development									
2.4 Extra expenditures for cleaner technologies									
2.5 Other costs									
3. Material purchase value of non-product output									
3.1 Raw materials									
3.2 Packaging									
3.3 Auxiliary materials									

3.4 Operating materials									
3.5 Energy									
3.6 Water									
4. Processing costs of non-product output									
Total environmental costs									
5. Environmental revenues									
5.1 Subsidies, awards									
5.2 Other earnings									
Total environmental revenues									

The environmental costs and revenues may be monitored for the company in general, but also for divisions (centers), outputs and processes.

Detailed definition of individual environmental costs and revenues categories

1. ***Waste, waste water and air emissions treatment***

The costs of waste, waste water and air emissions treatment (= non-product outputs) should be matched with the individual environmental domains.

1. 1 Depreciation for waste, waster water and air emissions treatment equipment
The equipment for waste treatment (for use or removal of waste), waste water treatment and air emissions capturing include for example: containers and collection vehicles, refuse compactors, incinerators, air pollution filters, waste water treatment plants etc. If possible, these equipments should represent individually recorded accounting centers. The category “equipment” for waste treatment, waste water treatment and air emissions may include also recultivation and decontamination of soil (domains: Biodiversity and Landscape, Soil and Ground and Surface Water).

1. 2 Equipment maintenance, operating materials and equipment-related services

Once the equipment for waste, waste water and air emissions treatment has been defined, the costs related to the mentioned equipment may be determined. The costs include consumption of operating materials, costs of equipment repair and maintenance, costs of controls and inspections etc.

1. 3 Personnel

This section calculates the time required for the waste, waste water and air emissions treatment. Time spent on inefficient production producing waste and time spent on activities under the pollution prevention and environmental management should be stated elsewhere. The costs include personal and other expenses on the personnel of departments in charge of collection of waste, personnel in charge of control and regulation of waste water and air emissions, personnel directly engaged in activities related to waste streams and operation of waste, waste water and air emissions treatment equipment.

1. 4 External services

This section includes payments to external organisations related to waste, waste water and air emissions management Services related to waste, waste water and air emissions treatment equipment are included in the preceding section (1. 2).. For example these costs include payments to external organisations for waste disposal, for liquidation of hazardous waste, for waste incineration and waste water treatment. This section comprises also costs of services related to removal of contaminated soil, rent for environmental equipment etc.

1. 5 Fees, taxes

This section states any and all

- fees for waste disposal,
- fees for waste collection, sorting and liquidation,
- fees for use of sewerage system and fees related to waste water – fees for polluted waste water, fees for waster water volume, fees for consumption of ground water,
- fees for air pollution,
- fees for produced, dispatched or imported ozone depleting substances,
- charges on mined out minerals,
- charges on mining site,
- charges on permanent or temporary exemption of soil from agricultural land If not included in the acquisition price (purchase value) of long-term fixed assets.,
- payments for exemption of forest soil from forest land If not included in the acquisition price (purchase value) of long-term fixed assets., but also
- costs of related permissions or
- environmental taxes (if any).

1. 6 Fines, penalties and damages

In case of infringement of laws, i.e. of generally applied regulations fines may be charged as a single financial penalty. For a breach of obligations resulting from concluded contracts or in case of a breach of payment terms a statutory penalty may be imposed, the amount of which derives from the duration of the default and it is stipulated as a percentage of the due amount. This section includes also damages paid by the company due to its responsibility to other companies or natural persons (for example damage caused by exhalations and waste water).

1. 7 Insurance for environmental liabilities

Companies may cover themselves against liability risks by insurance. The amount of the premium for insurance against damage to persons, goods and biodiversity caused by dangerous and potentially dangerous activities shall be stated in this section. This section also includes insurance related to higher fire risks or risks of other damage to production plant or risks during transport due to handling of dangerous substances and operation of dangerous processes.

The insurance for environmental liabilities is generally attached to the column of other costs rather than to any particular environmental domain.

1. 8 Provisions for cleanup costs and remediation

Examples of liabilities that might emerge from a company's activities include:

- ground water contamination (e.g. by solvents),
- surface water contamination (e.g. by spills and road accidents),
- air emissions (e.g. by release due to a failure of a pollution treatment equipment),
- energy emissions (e.g. by radioactive emissions),
- soil contamination (e.g. by contaminated surface water in case of missing protection troughs and collection tanks).

The liability vis-ŕ-vis third parties may be derived from legal regulations and laws. The obligations resulting from the law may include the obligation to adapt the equipment and procedures to the state of art, obligations related to waste management, the obligation to recycle and recultivate, the obligation to dispose of substances in certain intervals and the obligation to clean up the contaminated soil and contaminates sites.

1. 9 Other costs

This section should state other costs not recorded in the preceding items and related to waste, waste water and air emissions treatment (for example costs of environmental

damage removal and costs of recovery and cleanup of contaminated lands performed internally, i.e. by own activity).

2. Pollution prevention and environmental management

This section deals with costs related to the activities in scope of environmental management and pollution prevention.

2. 1 External services

This section includes all external (purchased) services related to the prevention and environmental management This section shall not include expenditures on research and development (related to environmental protection) performed by external organisations. - for example consultancy, training, inspections, audits and communication. If possible the stated services should be attached to the relevant environmental domains. Mostly they will be included in the item called "other", because they usually apply to all the domains simultaneously.

This section comprises also external services related to processing, print and delivery of reports on environmental impacts of the company and other costs of corporate communication activities.

2. 2 Personnel

This section states the costs related to the personnel in charge of the pollution prevention and environmental management. These activities include also trainings, projects, audits, communication. The costs in this section include for example also costs of business travels in scope of the environmental management. These costs do not include personal costs of the personnel in charge of waste, waste water and air emissions treatment equipment.

2. 3 Research and development The research generally means an activity aimed at acquisition of new scientific and technological knowledge. The development generally means application of the research results or of other knowledge for planning and design of new and substantially improved products, production materials, systems or services before commencement of commercial production or before provision of services.

The Research and Development section includes expenditures on research and development performed by external organisations, as well as expenditures on research and development performed by the company staff. This section comprises only the expenditures on research and development related to the environment. In addition to increased productivity and cost efficiency numerous research and development projects entail also mitigation of environmental impacts, change of raw materials and energy etc. This section should cover only the projects the main target of which consists in an improvement of the corporate environmental profile.

2. 4 Extra expenditures for cleaner technologies

To determine this item the costs of an environmentally less favourable solution should be compared to the costs of cleaner technologies. The comparison must consider identical initial conditions (same capacity etc.). The costs difference may be then considered as costs of environmental protection. However, if the cleaner technology represents a technology "common" in current conditions and if it replaces the existing older equipment, it should not be assessed as an environmental protection investment.

2. 5 Other costs

This section should state other costs not recorded in the preceding items and related to environmental management and prevention, for example extra costs resulting from procurement of environment-friendly materials, costs of preventive measures against environmentally detrimental adverse influences, costs of external communication, of publishing reports on the company's environmental impact etc.

3. Material purchase value of non-product output

Whatever has not left the company as a product is a sign of an inefficient production - waste, waste water or air emissions. The determination of environmental costs therefore requires an idea of the flows of materials, particularly raw and auxiliary materials. The price of materials that had gone through the production process and became waste (i.e. were wasted) represents an important element of the environmental costs.

3. 1 Raw materials

"Wasted" raw materials (i.e. raw materials contained in a non-product output) will mostly be disposed of as solid waste. Only in case of gaseous products (e.g. industrial gases) the non-product output will pollute the air. In some cases the "wasted" raw materials will become part of waste water.

3. 2 Packaging

Packaging will mostly leave the company with the products but a certain percentage should be reported as an environmental cost (internal losses, for example due to re-packaging). The price of materials packaging usually forms part of the purchase price of the material. Non-recyclable packaging will usually become waste and require liquidation. The material flow balance therefore includes also the waste packaging of products and packaging of raw materials, auxiliary and operating materials.

3. 3 Auxiliary materials

The content of auxiliary materials in a non-product output may be significant and therefore "wasted" auxiliary materials should be monitored and included in the environmental costs statement.

3. 4 Operating materials

A substantial part of these materials may represent a non-product output. The operating materials used in production should be distinguished from the operating materials used for administrative purposes.

3. 5 Energy

The input energy and the "non-efficient" energy consumed in production processes must be determined (estimated) by the production manager.

3. 6 Water

Determination of this item requires a water balance statement. The balance is based on the quantity of purchased water evaluable with purchase value. Waste water leaves the company. Part of this water disappears (e.g. pipe losses) and part of the water enters the products. This item should include the purchase value of the water leaving the company as waste water and disappearing by pipe leakages etc.

4. Processing costs of non-product output

The non-product output not only has the purchase value of the material but because it has undergone the production process the non-product output has consumed also other costs - expenditures on handling and processing. The price of the material must therefore be increased by the costs of "wasted" labour and capital.

This item should state the costs of labour spent on inefficient production, relevant share of the machinery and equipment depreciation and other costs. The processing costs of a non-product output are usually calculated on the basis of a percentage margin to the consumed materials in individual phases of production.

5. Environmental revenues

Environmental revenues include for example the revenues from materials recycling, subsidies and awards. They include also any and all revenues related to the items of environmental costs The environmental costs and revenues statement is compiled always for a particular period. Therefore the factual and time consistency of the costs and revenues with the given period must be secured.

5. 1 Subsidies, awards

This section should state the subsidies and awards related to the environmental protection and posted as revenues.

5. 2 Other earnings

This section comprises the revenues from selling recyclable waste (e.g. revenues from selling of substances caught by filter equipment, revenues from selling of sludge etc.). Other earnings may include revenues from use of by-product heat, revenues from waste water treatment plant treating waste water also for external customers etc.

4. Requirements on Material and Energy Flow Balance

The basis for an improvement of the corporate environmental profile consists in the material and energy flow balance (e.g. in kg/year) compiled with an input and output analysis. The limit of the balance may be the company in general, separate workplaces, plants, centers, processes, outputs etc.

The material and energy flow balance is based on the basic principle of the quantity of materials and energy entering the process, which must leave the system afterwards or must be included in the inventory. The flow balance states input materials and energy, as well as the resulting quantities of products, waste, waste water and air emissions. Inputs and outputs are measured in physical units (kg, t, GJ / period). The balance represents an important tool for an increased economic and environmental utilization of material and energy flows.

The material and energy flow balance may be elaborated only for several selected important materials and energies or for all materials and energies used in the company. The aim of the process is to track the way of materials and energy through the company.

Table 2 shows environmentally significant input and output flows of materials and energy that should not be neglected upon the balance compilation.

Table 2 Environmentally significant inputs and outputs

INPUT in kg, GJ / period	**OUTPUT v kg/ period**
Raw Materials	**Product**
Auxiliary Materials	Main product
Operating Materials	By-products
Packaging	**Waste**
Energy	Municipal waste
Gas	Recyclable waste
Coal	Hazardous waste
Fuels	**Waste Water**
District heat	Waste water amount
Renewable sources (biomass, wood)	Heavy metals
Solar energy, wind, water	ChSK
Externally produced electricity	BSK5
Internally produced electricity	**Air-Emissions**
Water	CO2
Municipal water	CO
Ground water	NOx
Spring water	SO2
Rain / surface water	Dust
	NH4, volatile org. substances
	Ozone depleting substances

The input / output balance is compiled always for a particular period and compared to the information from the accounting system, from the inventory and acquisition system etc. The corporate material and energy flows should be monitored not only from the point of view of their quantity but also with regard to the value thereof.

5. Closing Provisions

The Ministry of Environment reserves the right to change this guideline.

This guideline comes in force end effect on 1 January 2003.